

## AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application.

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1. **(Original)** A method of designing a customized golf club, comprising:
- determining a tempo function relating tempo to club length for a particular golfer;
  - determining a perceived force function relating perceived force to club length and club head mass for the golfer;
  - selecting two design parameters from the group consisting of
    - target distance for the club;
    - club length and shaft flexibility for the club; and
    - preferred trajectory for a golf ball; and
  - using the selected design parameters, together with the determined tempo and perceived force functions, to calculate optimum values for the unselected design parameter and the club head mass for the customized golf club.
2. **(Original)** The method of claim 1, wherein tempo is measured by speed of the golfer's hands at impact.
3. **(Original)** The method of claim 1, wherein perceived force is measured by centripetal force applied along the shaft at impact.
4. **(Original)** The method of claim 3, further comprising measuring an effective arm length of the golfer in order to determine the centripetal force.
5. **(Currently Amended)** A method of designing a customized golf club, comprising:
- determining a tempo function relating tempo to club length for a particular golfer;
  - determining a perceived force function relating perceived force to club length and club head mass for the golfer, wherein perceived force is measured by centripetal force applied along the shaft at impact;

selecting two design parameters from the group consisting of  
target distance for the club;  
club length and shaft flexibility for the club; and  
preferred trajectory for a golf ball; and

using the selected design parameters, together with the determined tempo and  
perceived force functions, to calculate optimum values for the unselected design  
parameter and the club head mass for the customized golf club; and

measuring an effective arm length of the golfer in order to determine the  
centripetal force, wherein the effective arm length is selected from the group consisting  
of arm length, distance from hands to sternum in address position, and distance from  
hands to collarbone in address position.

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6. **(Original)** The method of claim 1, wherein trajectory is controlled by varying club head loft.
  7. **(Original)** The method of claim 6, wherein the club head loft is the design loft.
  8. **(Original)** The method of claim 6, wherein the club head loft is the effective loft.
  9. **(Original)** The method of claim 1, further comprising optimizing the lean angle of the clubs.
  10. **(Original)** The method of claim 1, wherein the tempo is independent of club length.
  11. **(Original)** The method of claim 1, wherein the tempo is a linear function of club length or of club length plus arm length.
  12. **(Original)** The method of claim 1, wherein the tempo is a power-law function of club length or of club length plus arm length.

13. **(Original)** The method of claim 1, wherein the perceived force is independent of club length.
14. **(Original)** The method of claim 1, wherein the perceived force is a linear function of club length or of club length plus arm length.
15. **(Original)** The method of claim 1, wherein the perceived force is a power-law function of club length or of club length plus arm length.
16. **(Original)** The method of claim 1, wherein the perceived force is independent of club length and the tempo is proportional to the square root of club length plus arm length.
17. **(Original)** The method of claim 1, further comprising designing a second golf club having at least one different design parameter from the first club, wherein the same tempo function and perceived force function apply to both clubs.
18. **(Original)** The method of claim 17, wherein the two golf clubs have a reduced difference in perceived length.
19. **(Currently Amended)** A method of designing a customized golf club, comprising:  
determining a tempo function relating tempo to club length for a particular golfer;  
determining a perceived force function relating perceived force to club length and club head mass for the golfer;  
selecting two design parameters from the group consisting of  
target distance for the club;  
club length and shaft flexibility for the club; and  
preferred trajectory for a golf ball; ~~and~~  
using the selected design parameters, together with the determined tempo and perceived force functions, to calculate optimum values for the unselected design parameter and the club head mass for the customized golf club; and  
designing a second golf club having at least one different design parameter from

the first club, wherein the same tempo function and perceived force function apply to both clubs, wherein the two golf clubs have a reduced difference in perceived length, and wherein the perceived length is measured by determining the radius of gyration of a club about a selected center point.

20. **(Original)** The method of claim 19, wherein the center point is selected by  
having the golfer swing a test club to determine its perceived length;  
having the golfer swing a comparison club one or more times while adding weight to the comparison club at a selected point along the shaft until the golfer is unable to distinguish the perceived lengths of the test club and the comparison club; and  
determining the center point around which the test club and the weighted comparison club have identical radii of gyration.
21. **(Original)** The method of claim 1, comprising designing up to thirteen golf clubs all having the same tempo and perceived force functions and reduced differences in perceived lengths.
22. **(Original)** The method of claim 1, further comprising constructing the designed club using a CAD/CAM system.
23. **(Original)** A method of determining a perceived center of gyration for a golfer, comprising  
having the golfer swing a test club to determine its perceived length;  
having the golfer swing a comparison club one or more times while adding weight to the comparison club at a selected point along the shaft until the golfer is unable to distinguish the perceived lengths of the test club and the comparison club; and  
determining the center point around which the test club and the weighted comparison club have identical radii of gyration.
24. **(Original)** A method of constructing a matched set of golf clubs for a golfer, comprising

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determining a perceived center of gyration according to the method of claim 23;  
and  
constructing a plurality of clubs having reduced variation in radius of gyration  
with respect to the determined center point.

25-45. (Canceled)

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